On the record – observing a ‘heatwave’

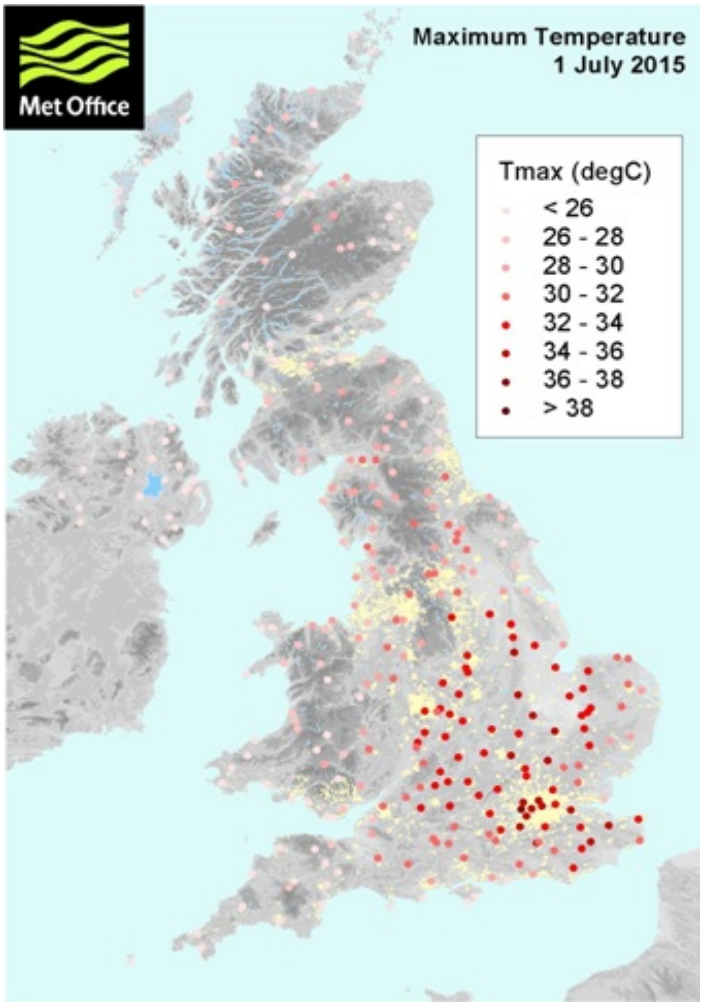
Description

Last week on 1 July the UK saw its warmest July daily max temperature on record (records date back as far as 1853), with 36.7 °C at Heathrow. This has led to considerable interest in the wider context of the record temperatures. Here, Mark McCarthy, Manager of the Met Office National Climate Information Centre discusses records and how we record them.

Where were record temperatures observed on 1 July 2015?

Although Heathrow measured the highest temperature recorded by the Met Office observing network on a July day, record temperatures were reported across a wide stretch of the country, including from some of the Met Office’s very long running climate stations.

Temperatures exceeded 35 °C at a handful of locations in London and the south east, but also reached the low 30s across the Midlands, East Anglia and parts of north-west and north-east England. It is in these areas that July temperature records were broken.



Map showing stations recording new July temperature records, 1 July 2015

The table below lists those stations with more than 50 years of observations for which 1 July 2015 was a record. These data show that record temperatures for July were not confined to London or other major urban centres. The records were, in fact, part of a larger scale pattern of high temperatures extending through Spain, Portugal and France.

SITE	DATE OF PREV JULY RECORD	PREV RECORD JULY MAX (°C)	1 JULY 2015 MAX (°C)	YEARS OF DATA
Durham	31/7/1943, 10/7/1921	30.6	31	133
Sheffield	31/7/1943, 10/7/1921	31.7	33.3	130
Bradford	31/7/1943, 13/7/1935	30.6	30.9	106
Cranwell	22/7/1996	32.6	34.3	93
Sutton Bonnington	19/7/2006	32.9	33.6	84
Stonyhurst	3/7/1976	31.1	32.6	75
Manston	15/7/1983	31.4	33.6	74

Goudhurst	3/7/1976	32.8	33.3	74
Waddington	12/7/1949	32.2	33.1	67
Heathrow	19/7/2006	35.5	36.7	66
Nottingham (Watnall)	3/7/1976	32.3	33.9	64
Marham	3/7/1976, 5/7/1959	32.8	33.5	58
Wittering	5/7/1959	32.8	35.3	53
St James's Park	5/7/1959	34.4	34.7	52

How does this compare to past heatwaves?

Temperatures over 36 °C reported at any station in the UK observing network are very rare, with only a handful of notable heatwaves seeing such extremes. The heatwaves of August 1990, August 2003, and July 2006 each saw a number of stations exceed 36 °C, whereas on 1 July 2015 Heathrow was the only station.

The Met Office maintains a list of climate extremes for the UK. It is standard practice to report the highest and lowest temperature every month as part of our routine monitoring of UK weather and climate. It is therefore always noteworthy when one of these records is broken.

While there is no doubt that some previous heatwaves have seen more extreme or more widespread high temperatures overall – particularly in the climatologically warmer period from late July into early August – 1 July 2015 has the honour of holding the highest recorded temperature for a July day with 36.7 °C at Heathrow.

How do you ensure the data are reliable?

To ensure consistency, Met Office weather records are only given for stations with standard instruments and exposure. This means that our records would not represent the extremes that may have occurred in places where we do not have standard instruments. This may have been the case on 1 July 2015, where the availability of additional data from amateur observers contributing to Met Office WOW show peak temperatures in the range 35 to 37 °C to the west London.

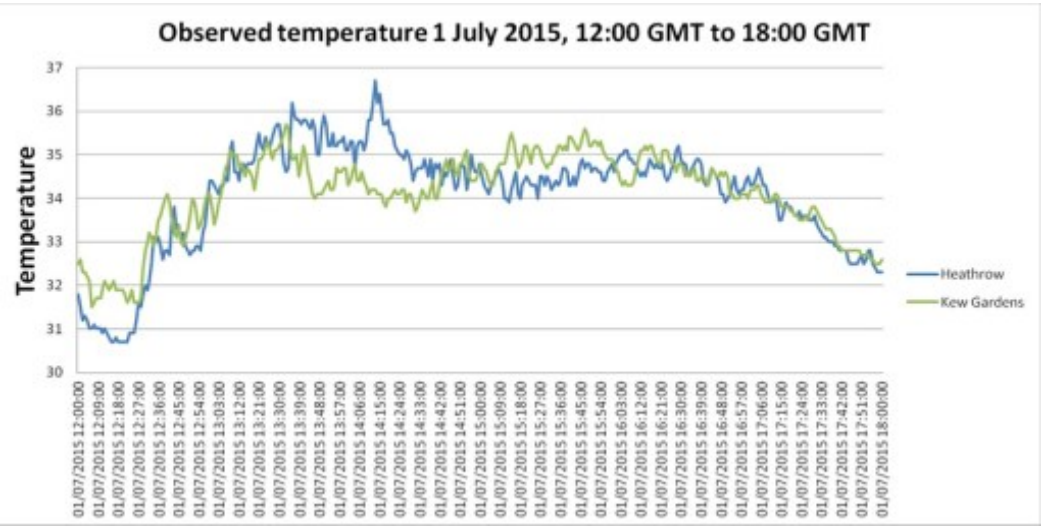
It is reasonable to ask whether Heathrow, as a major international airport, can provide a reliable climatological record. Are the observations biased by the presence of runways and air traffic?

The instrumentation and station enclosure are managed so that they meet the standards required by the Met Office and set out by the World Meteorological Organization. The site has been operating for 66 years and provides an excellent long observational series for west London.

The first thing we can do is compare the climatological temperatures with a nearby station at Kew Gardens. The average daytime maximum temperatures for the two sites are very close:

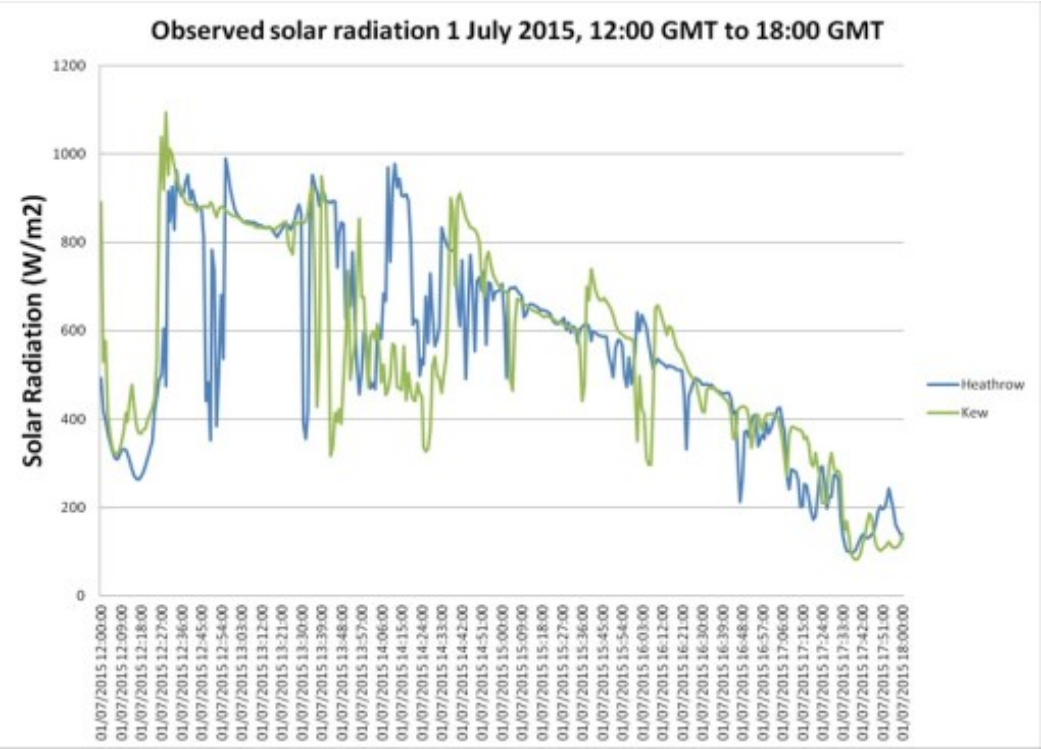
Site	June	July	August
Heathrow	21.04 °C	23.54 °C	23.15 °C
Kew	21.02 °C	23.48 °C	23.15 °C

On 1 July the maximum temperature recorded at Heathrow (36.7 °C) was higher than Kew (35.7 °C). Modern instrumentation means we can look at the temperatures minute-by-minute at the two sites, as shown below. The two locations recorded very similar temperatures through most of the afternoon and the average temperature at the two sites between 12:00 and 18:00 GMT agree to within 0.02 °C. However, there was a peak in temperature at Heathrow between 14:00 and 14:30 GMT that was not seen at Kew Gardens. What could cause such a peak?



Temperature (°C) graph for Heathrow and Kew Gardens 1 July 2015

There were scattered clouds in the area that afternoon. Both Heathrow and Kew Gardens have instruments measuring solar radiation, shown in the graph below. Both sites recorded a general dip in solar radiation due to clouds from approximately 13:30 to 15:00 GMT which corresponds to a slight cooling at both sites. Heathrow saw a short gap in the clouds shortly after 14:00 GMT which resulted in a similarly short lived peak in temperature, while Kew Gardens remained cloudy. In turn Kew Gardens then saw a brief spell being sunnier than Heathrow just before 15:00 GMT and became warmer than Heathrow for about an hour.



Solar radiation (W/m2) graph for Heathrow and Kew Gardens 1 July 2015

Date Created
July 2015

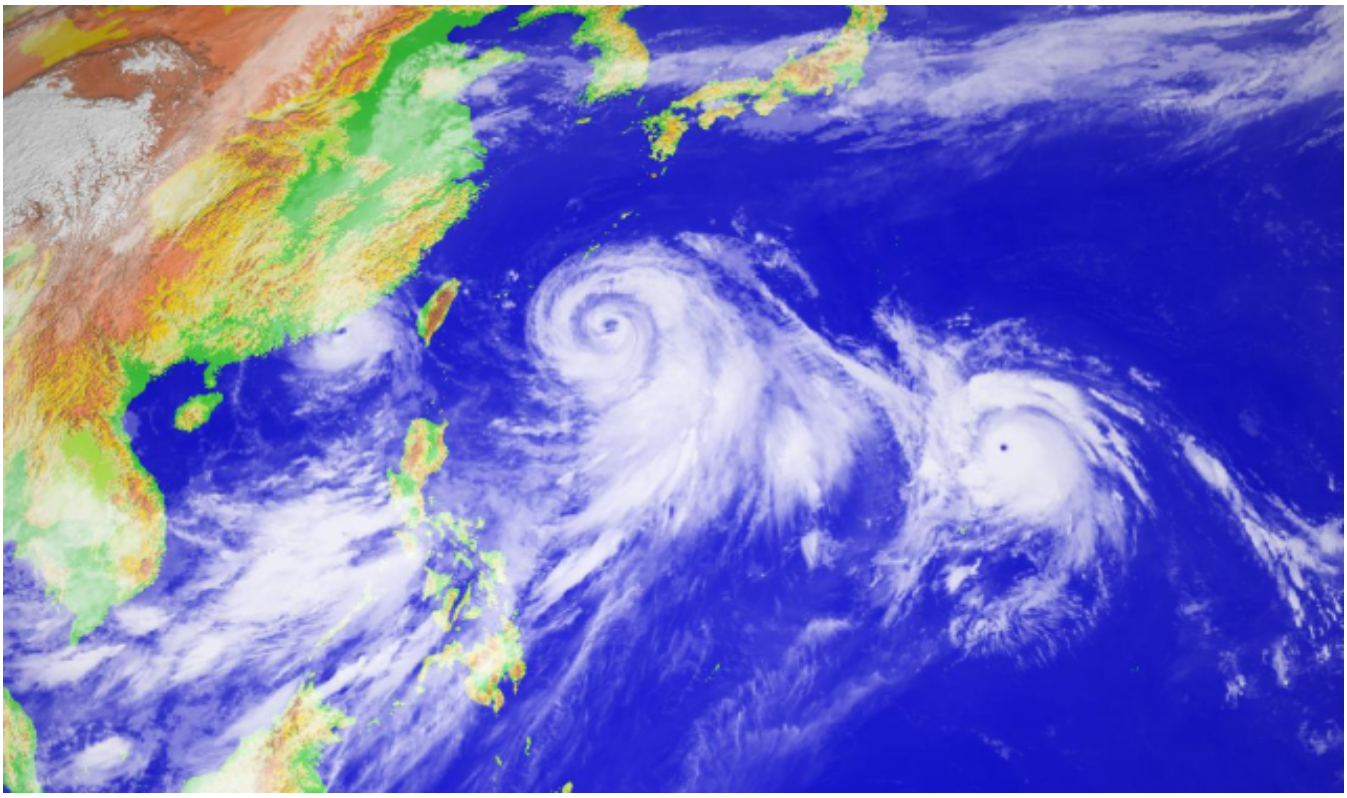
Multiple tropical cyclones in the Pacific

Description

The Pacific Ocean has seen a lot of early season tropical cyclone activity with a total of 11 cyclones forming before the end of June. This included some intense systems such as typhoons Higos, Maysak, Noul and Dolphin in the west Pacific and hurricanes Andres and Blanca in the east Pacific.

After a brief respite, early July has seen the development of further tropical cyclones across the Pacific Ocean triggered by a cyclical phenomenon known as the Madden-Julian Oscillation (MJO). The MJO is a pulse of cloud and rain which works its way eastwards around the globe in tropical regions. It often is seen to start in the Indian Ocean before crossing into the Pacific Ocean and occurs on a timescale of 30 to 60 days. The magnitude of the MJO will vary, but the event which moved into the western Pacific early in July has been very strong. A strong MJO produces conditions which are very conducive for tropical cyclone formation.

At the start of the month, the MJO event resulted firstly in the spinning up of twin cyclones – storms either side of the equator at the same longitude. Chan-hom formed in the north Pacific, whilst Raquel developed south of the equator. Raquel brought unseasonal heavy rain to the Solomon Islands before dissipating.



Left to right – Typhoons Linfa, Chan-hom and Nangka on 9 July 2015.
Image courtesy of The National Institute of Informatics.

Chan-hom has continued to develop into a typhoon and has been joined by Typhoon Linfa to the west and Typhoon Nangka to the east as seen in the satellite image.

Linfa has just made landfall over southern China and is expected to bring stormy conditions to Hong Kong in the next day or so. Chan-hom is expected to pass close to the Japanese island of Okinawa before making landfall over eastern China. Nangka is currently over open ocean, but could affect south-western Japan in a few days time.

The tropical cyclone activity does not end there, however. As the MJO event moves east it is set to trigger more tropical cyclones in the central and eastern Pacific. Tropical Storm Ela has already formed and is set to pass just north of Hawaii in the next few days. There is also the indication from computer forecast models that one or two more tropical cyclones could develop in the eastern side of the Pacific in the next week.

The strong westerly winds associated with the latest MJO event are helping to enhance the developing El Niño by pushing warm waters in the western Pacific towards the east. A strong El Niño tends to promote tropical cyclone activity in the Pacific whilst suppressing it in the Atlantic.

Conditions are very unfavourable for the development of tropical cyclones in the Atlantic at present and we expect this to continue for much of the season. However, whilst activity is expected to be below average, this does not exclude the possible development of a few hurricanes in this region during the remainder of the year. Meanwhile, the Pacific is expected to see continued above average levels of tropical cyclone activity.

Official warnings for the latest tropical cyclones are produced by the Japan Meteorological Agency and the Central Pacific Hurricane Center. The Met Office routinely supplies predictions of cyclone tracks from its global forecast model to regional meteorological centres worldwide, which are used along with guidance from other models in the production of forecasts and guidance. We also provide updates on current tropical storms via @metofficestorms on Twitter.

Date Created
July 2015

Record levels of Pacific tropical cyclone activity continue

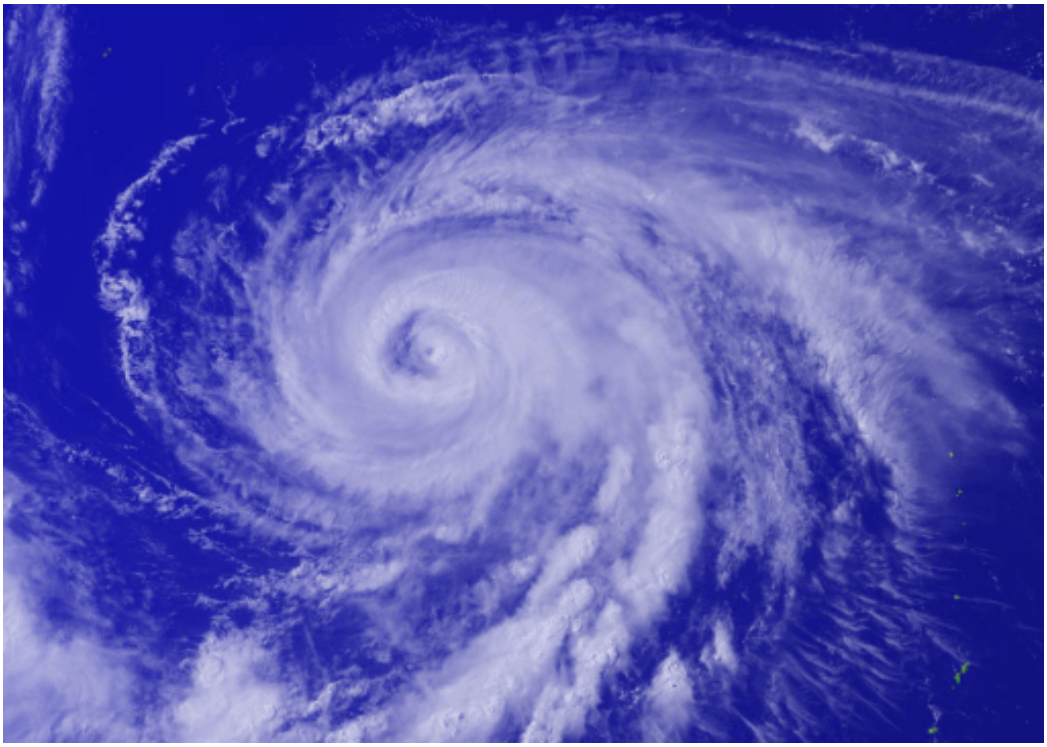
Description

The Pacific Ocean has seen an extremely high number of tropical cyclones during the early part of this season, with several more tropical storms developing over the weekend.

Across the whole Pacific Ocean nine tropical cyclones have formed in the last two weeks. The recent high level of activity is a response to the recent strong episode of the Madden-Julian Oscillation combined with the developing El Niño conditions as described in our previous blog.

Several of the recent tropical cyclones have formed over open ocean and have caused little or no disruption. However, others have either affected land areas or are set to do so this week.

Typhoon Chan-hom passed very close to the coast of China at the weekend, with over a million people having to be evacuated from the Shanghai region. Whilst coastal areas saw heavy rain and powerful waves, they were spared the strongest winds as the eye of the typhoon stayed offshore. Chan-hom brought heavy rain to North Korea with 400mm having been recorded at Kimchaek on the northeast coast.



Typhoon Nangka on 13 July 2015.
Image courtesy of The National Institute of Informatics

Typhoon Nangka has just turned northwards in the west Pacific and looks set for landfall over south-western Japan on Thursday bringing the risk of strong winds, heavy rain and storm surge.

Across the other side of the Pacific, Tropical Storm Dolores looks set to become a hurricane as it runs parallel to the Mexican coast. It is most likely to stay out at sea, but there remains a low possibility that it could turn towards the coast in a few days time.

Pacific records

The recent high levels of tropical cyclone activity have resulted in some remarkable statistics.

- Seven tropical cyclones (including four major typhoons) occurred in the western North Pacific before the end of May beating previous records.
- The three tropical cyclones which have formed in the central North Pacific this week formed earlier in the season than any previous tropical cyclone in this region. There have never been three storms form in such quick succession in this region.
- Eight tropical cyclones have formed across the eastern and central North Pacific so far this year – the earliest in the season this has ever occurred.
- Across the whole North Pacific there have been 19 tropical cyclones so far this year. Taking into account their strength and longevity this amounts to a record 321% of normal activity for this point in the season.

Atlantic calm

By contrast the Atlantic remains very quiet. Two short-lived tropical storms have formed so far (Ana and Bill), but conditions are not conducive for further development in the near future in the tropical Atlantic:

- Sea surface temperatures in tropical areas are up to 2°C below normal values
- Wind shear (which inhibits tropical cyclone development) has been persistently high for several weeks.
- Sea level pressure has been at record high values in the last month.

The growing El Niño is likely to maintain conditions which suppress tropical cyclone activity in the tropical Atlantic for the foreseeable future. However, some tropical cyclone activity cannot be ruled out – particularly outside of the tropics at higher latitudes where conditions are not as harsh as those described above.

Further Information

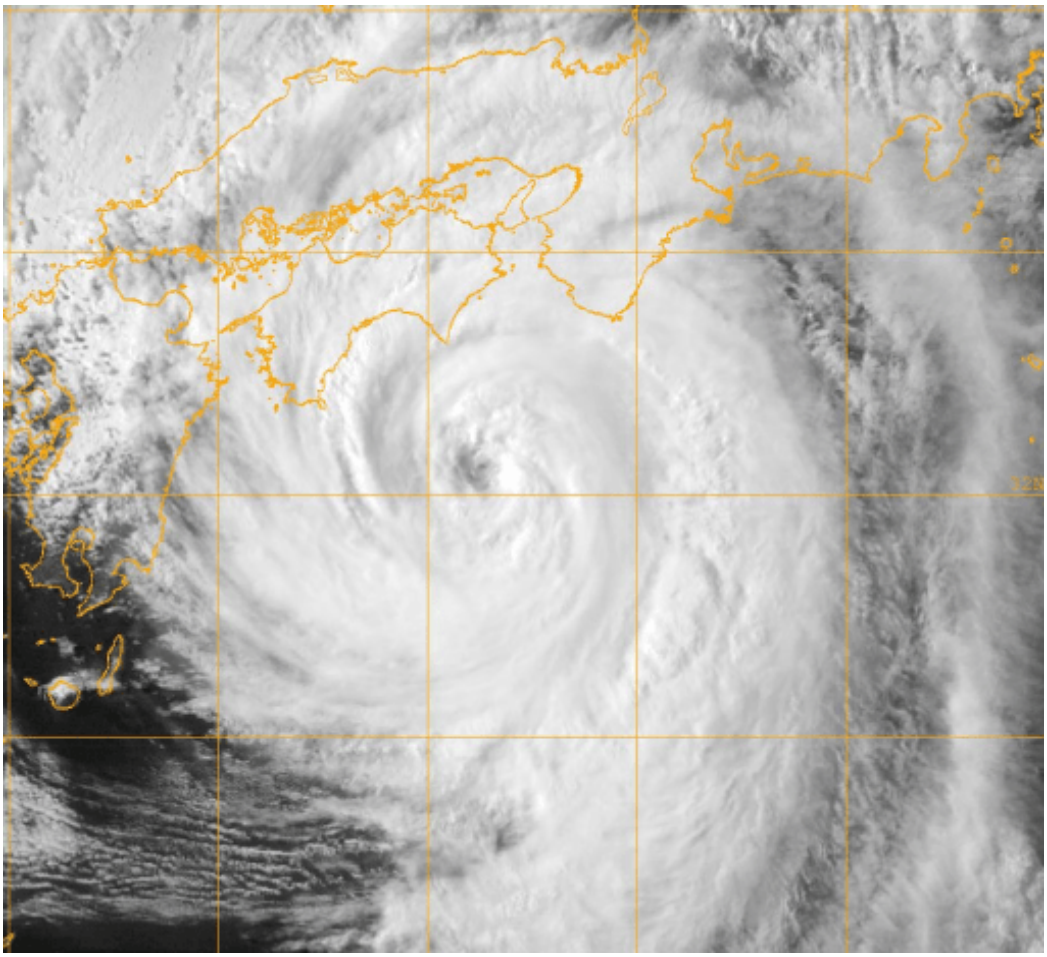
Official warnings for the latest tropical cyclones are produced by the Japan Meteorological Agency, the Central Pacific Hurricane Center and the National Hurricane Center. The Met Office routinely supplies predictions of cyclone tracks from its global forecast model to regional meteorological centres worldwide, which are used along with guidance from other models in the production of forecasts and guidance. We also provide updates on current tropical storms on StormTracker and via @metofficestorms on Twitter.

Date Created
July 2015

Typhoon Nangka makes landfall over Japan

Description

In our blogs of 9 July and 13 July we described how the developing El Niño and a cyclical phenomenon known as the Madden-Julian Oscillation have combined to produce a period of high tropical cyclone activity in the Pacific. Nine storms developed inside two weeks – Linfa, Chan-hom, Raquel, Nangka, Ela, Halola, Iune, Dolores and Enrique. This is the highest number of Pacific tropical cyclones to form inside a two week period since 1968.



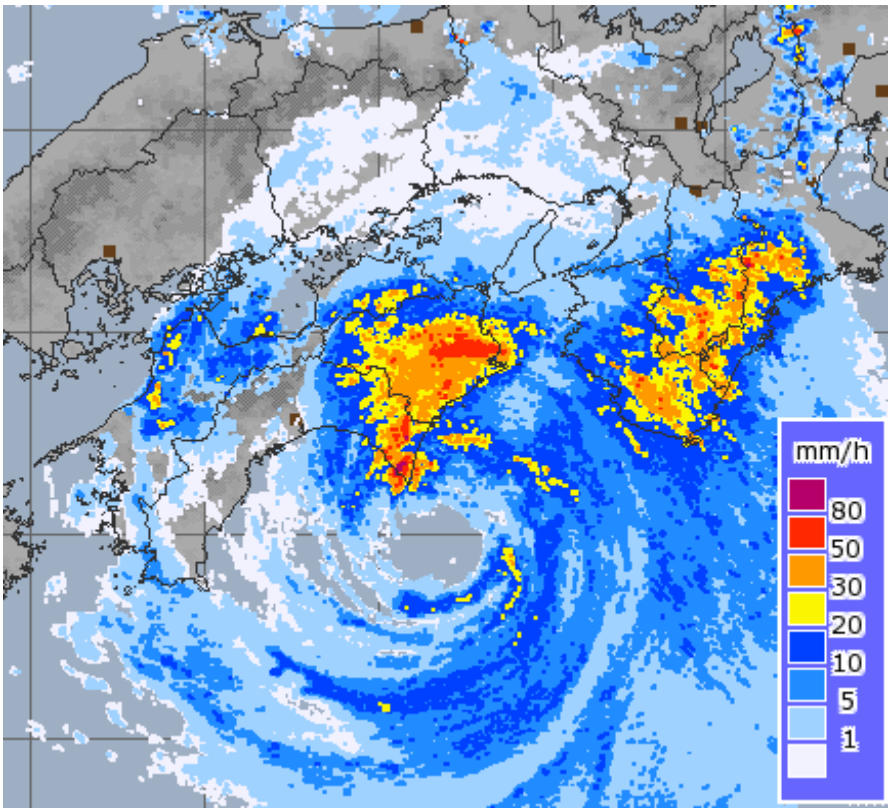
Typhoon Nangka on 16 July 2015. Image courtesy of The US Naval Research Laboratory.

Typhoon Nangka formed almost two weeks ago close to the International Dateline and made a steady westward journey peaking in strength with winds of near 150 mph. It then turned north and started to weaken, but is now making landfall over southern Japan, still at typhoon strength.

Japan can sometimes receive several typhoon strikes in a season, but each time they bring much disruption and some destruction through a combination of wind, surge and rainfall. It is often the rainfall

that can be most devastating as the typhoon draws huge amounts of moisture from the warm tropical ocean and deposits it over land.

Kamikitayama in southern Honshu has recorded 438.5 mm (17.3”) rain in a period of 24 hours and this is before the eye of Typhoon Nangka has even made landfall. It is possible that some locations could record over 600 mm of rain by the time the typhoon has passed. To put that into context, that’s more than the yearly rainfall for some parts of east England.



Typhoon Nangka Radar Image at 1255 (UK time) 16 July 2015 showing rainfall intensity. Image courtesy of The Japan Meteorological Agency.

As Nangka crosses the islands of Shikoku and Honshu it is expected to weaken, but continue to produce heavy rain. Once over the Sea of Japan, Nangka is likely to make a rightwards turn and so could affect parts of northern Japan before finally dissipating.

Official warnings for the latest tropical cyclones in the western North Pacific are produced by the Japan Meteorological Agency. The Met Office routinely supplies predictions of cyclone tracks from its global forecast model to regional meteorological centres worldwide, which are used along with guidance from other models in the production of forecasts and guidance. We also provide updates on current tropical storms via @metofficestorms on Twitter.

Date Created
July 2015

Annual State of the Climate Report for 2014 published

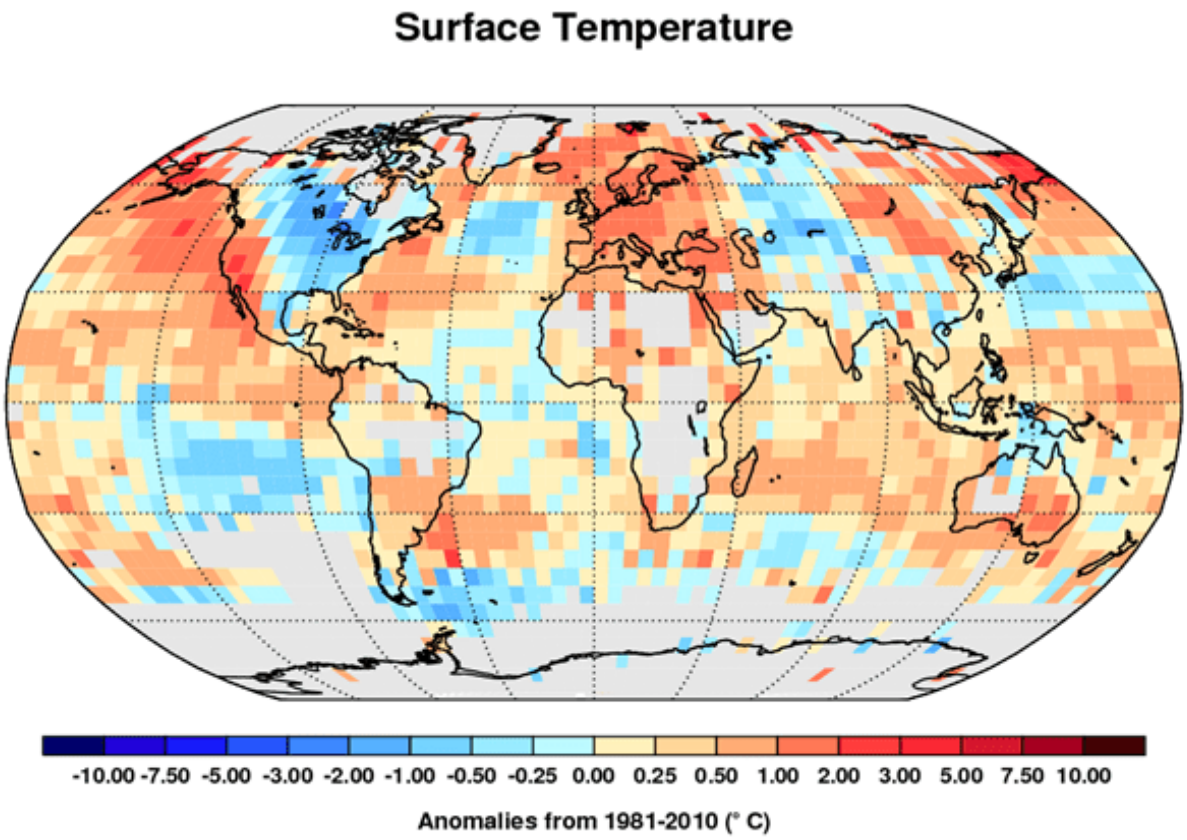
Description

A report which looks at all the climate variables that can be measured for 2014 has been released today.

The annual ‘State of the Climate’ report has been published by the American Meteorological Society, presenting summaries for all so-called Essential Climate Variables (ECVs).

These include various types of greenhouse gases, temperatures throughout the atmosphere, ocean, and land, water cycle variables, ocean variables such as sea level and salinity, sea ice extent, permafrost temperatures and others. The majority of these reflect a planet that is continuing to warm.

The exceptional warmth of 2014 occurred against a backdrop of neutral to marginal El Niño conditions. Europe was especially warm and all land regions apart from North America showed above average frequency of warm extremes.



Annual average anomalies (difference to normal) for 2014 for surface temperature from the Met Office's global temperature dataset, HadCRUT4 relative to a 1981-2010 climatology period.

Over oceans, global sea surface temperatures and ocean heat content were also observed to be exceptionally warm and sea level exceptionally high.

The significant warmth is reflected strongly in regions of snow and ice. Arctic sea ice was well below average but above the exceptional lows seen in 2007, 2011 and 2012. Glacier volume is declining year on year – preliminary results for 2014 make it the 31st consecutive year of decline.

Long-lived greenhouse gases continued to increase, primarily owing to rising carbon dioxide (CO_2) concentrations, in addition to methane (CH_4), nitrous oxide (N_2O) and other minor trace gases.

The Met Office's Kate Willett, a lead chapter editor on the new report, said: "The comprehensive view of the different variables in the report enables a better understanding of the interconnectedness of our climate system."

'State of the Climate in 2014' is the 25th consecutive instalment of the report, which is lead by scientists from NOAA's National Centers for Environmental Information, along with 413 scientists from 58 countries.

Met Office scientist Kate Willett leads the Global Climate chapter and several other Met Office scientists contribute, using Met Office Hadley Centre climate data. All reports are freely available online.

Date Created

July 2015

Early July sees big rainfall contrasts

Description

After a hot and humid start to the month, when record daily maximum temperatures were recorded at several stations across the country on 1 July, it has been a fairly average month so far for the UK as a whole. However, on a regional scale there are some contrasts.

Using figures up to 15 July, mean temperatures have been close to or above average, with counties in eastern and southeastern England highest relative to average.

Meanwhile, for rainfall there are more notable variations, with eastern parts of England having received around or less than half the amount of rainfall that would be expected by mid-month. For example, Surrey and Sussex have both recorded less than 20% of the month's average rainfall with 7.8mm and 9.9mm respectively. By the 15th of the month you would normally expect around 48% of the whole-month average.

This is in comparison with parts of Eastern Scotland where some places have already recorded more rainfall than the whole-July average. Aberdeenshire and Kincardineshire have already seen rainfall in excess of July's average at 79mm and 106.6mm.

After the hot, sunny start to the month there have been periods of unsettled weather, with weather systems arriving from the Atlantic bringing rain or showers at times. This has been interspersed with drier, sunny spells.

With west or southwesterly winds dominating, there have been some rather cloudy days in the south, leading to mild nights.

The table below shows figures for the 1-15 July. You would normally expect about 48% of the full-month average for sunshine and rainfall at this point in the month.

	Mean temperature		**Sunshine duration**		**Rainfall**	
1-15 July	**Act (°C)**	**Diff from avg (°C)**	**Act (hrs)**	**% of avg**	**Act (mm)**	**% of avg**
UK	15.5	0.4	88.0	51	46.9	60
England	17.0	0.7	103.7	54	30.5	49
Wales	15.4	0.2	89.2	50	56.4	61
Scotland	13.3	0.0	66.8	47	71.9	72
N Ireland	14.2	-0.4	57.7	41	45.9	57

Date Created

July 2015

Met Office Science Camps a huge success

Description

Over 200 secondary school pupils have taken part in four Met Office Science Camps this year.

The overnight camps, held at Met Office HQ in Exeter, provided a unique opportunity for 11-13 year old to join in a selection of hands-on activities led by Met Office staff. The activities covered a wide range of topics and helped explain how we measure and forecast the weather and climate.

Twelve schools and three scouts/guide groups took part in the events and Director of Science at the Met Office, Andy Brown said: “As well as being fun, Met Office Science Camps engage, challenge and enthuse students, encouraging them to develop scientific skills and hopefully inspire the scientists of the future.”

As one of the UK’s top science and engineering organisations, the Met Office is continually looking at ways to engage people, young and old, in the fascinating worlds of weather and climate science.

The Met Office Science Camps are part of the Met Office STEM (Science, Technology, Engineering and Math’s) Outreach programme which aims to improve understanding of how weather and climate are measured and forecast. The programme has been awarded the European Meteorological Society Outreach and Communication Award in recognition of our outstanding efforts to engage young people.

Over the last decade or so, predicting the weather and climate has become one of the most important areas of scientific research. Work at the Met Office is incredibly varied, and this is reflected in the variety of career opportunities available, including everything from Science and Forecasting to

Engineering and Business Development.

You can hear from a whole range of different people who are employed at the Met Office, from IT specialists to Climate Change scientists, in a series of podcasts.

How to Register

If your school or organisation would like to be added to our mailing list for the 2016 Met Office Science Camps, please email us at science.camp@metoffice.gov.uk with your name and the school (or organisation) that you are emailing on behalf of. We take group bookings from schools or other organisations, rather than individual campers. If you are a parent or student looking to get involved then please get in touch with a teacher at your school and ask them to contact us.

If you have any queries, please email us: science.camp@metoffice.gov.uk.

Date Created
July 2015

A summer forecasting challenge for Friday

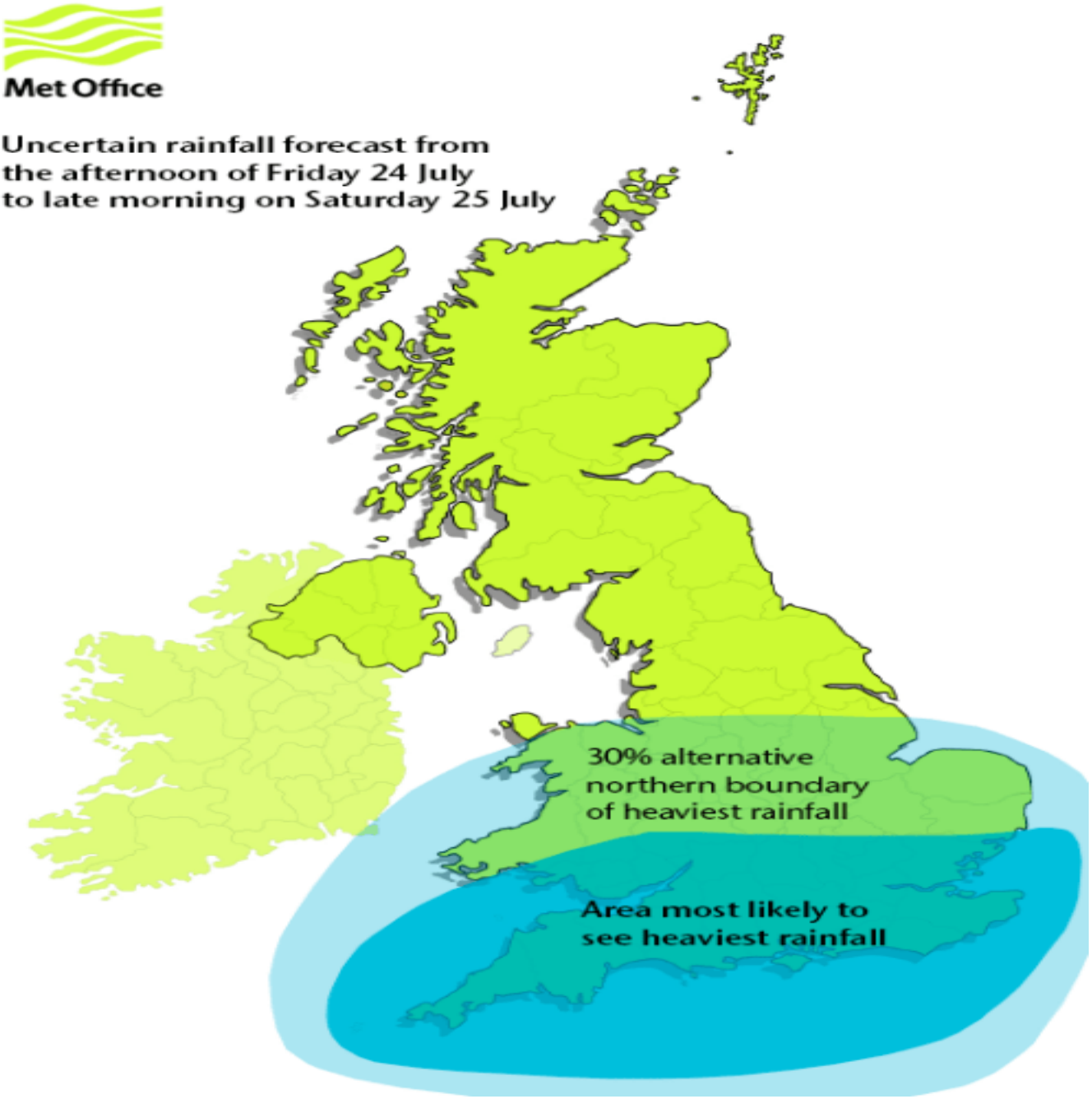
Description

Forecasting rainfall for the UK during the summer has always posed a more difficult challenge than other times of year – and the weather for this Friday is a perfect example.

The various computer models the Met Office uses to forecast the weather differ on how a low pressure system forming to the west of the UK will behave.

We know that it will bring some wind and rain to the southern half of the UK, but there is no consensus on exactly which track it will take across the country and precisely when it will arrive.

Below you can see the area most likely to see some persistent rain during Friday and into Saturday. There is a 30% chance that rainfall could extend further north than this. The system is likely to bring up to 15-25 mm of rain and winds of up to 30 mph, mainly in exposed areas.



Currently there are no plans to issue a weather warning for this event, but clearly it has the potential to affect people's plans for Friday now summer holidays are in full swing. You can hear more about Friday's forecast in the video below.

We'll be keeping a close eye on the situation as it develops to ensure everyone has the clearest picture of what's likely for Friday, so it's worth staying up to date with the forecast over the next couple of days.

The current situation is a good example of why summer is tricky because at this time of year the details are vitally important.

Will the showers be inland or at the coast, when will low cloud clear to let warm sunshine through? In

winter this might not be so important, but in summer when many are outside making the most of all the UK has to offer it can make a huge difference to your day.

Familiar features of our landscape such as hills, valleys or the sea can cause subtle variations in heat and moisture and therefore dominate the local weather outcome. This can result in big differences in the weather in quite small areas, it can be sunny on the beach but raining inland or a village fair could be rained off while the next village down the road is dry.

At this time of year it’s always a good idea to keep a close eye on the forecast as the situation can change from day to day.

We’re always harnessing new science and technology to make forecasting ever more accurate and summer forecasting is a major focus for future gains.

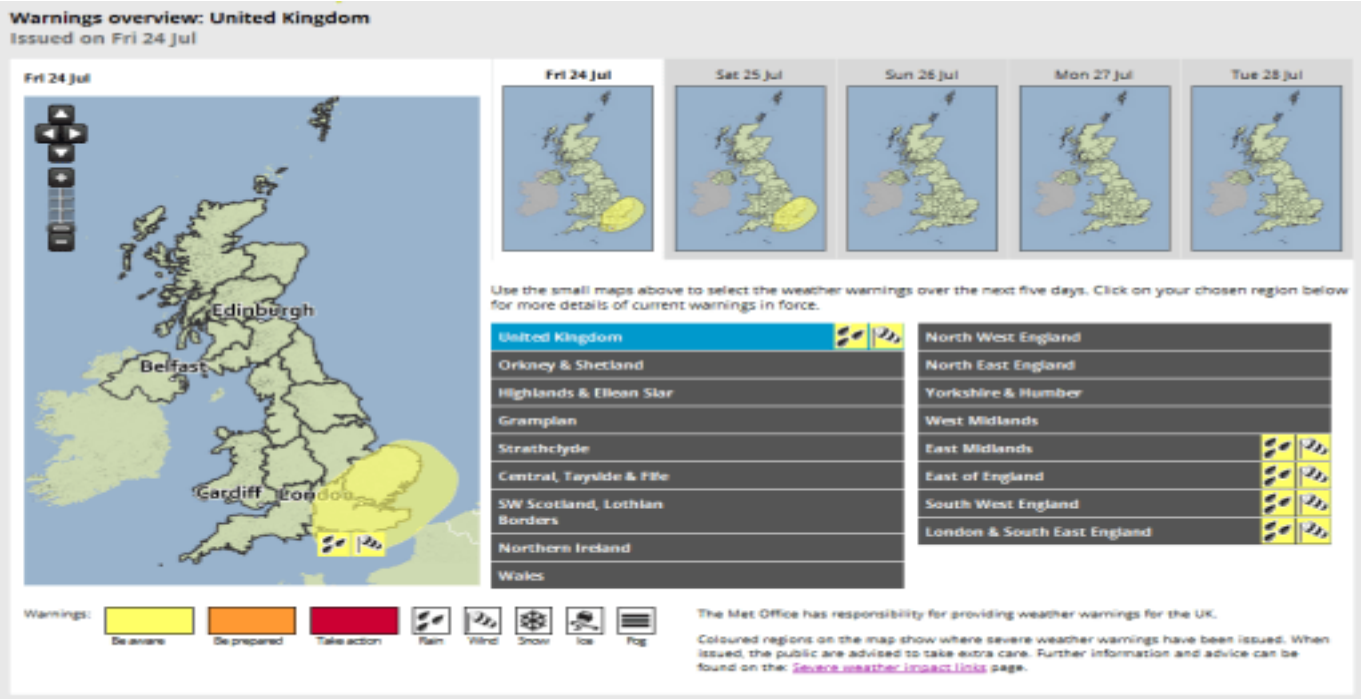
Date Created
July 2015

A wet getaway

Description

As many of us plan to head off on holiday, heavy rain and strengthening winds cross southern England today (Friday), persisting overnight in the east, before clearing on Saturday morning.

A Yellow warning has been issued for southeast England and East Anglia, valid from Friday afternoon to 11am Saturday because of the potential impacts the heavy rain and wind could have.


Warnings overview: United Kingdom
Issued on Fri 24 Jul
Fri 24 Jul
Sat 25 Jul
Sun 26 Jul
Mon 27 Jul
Tue 28 Jul
Edinburgh
Belfast
Cardiff
London
Use the small maps above to select the weather warnings over the next five days. Click on your chosen region below for more details of current warnings in force.
United Kingdom
Orkney & Shetland
Highlands & Eilean Siar
Grampian
Strathclyde
Central, Tayside & Fife
SW Scotland, Lothian Borders
Northern Ireland
Wales
North West England
North East England
Yorkshire & Humber
West Midlands
East Midlands
East of England
South West England
London & South East England
Warnings:
Be aware
Be prepared
Take action
Rain
Wind
Snow
Ice
Fog
The Met Office has responsibility for providing weather warnings for the UK.
Coloured regions on the map show where severe weather warnings have been issued. When issued, the public are advised to take extra care. Further information and advice can be found on the Severe weather impact links page.

As an area of low pressure is crossing northeastwards across the UK today (Friday), close to southern England, it deepens into quite an intense feature for this time of year and is expected to bring disruptive rain and wind, particularly within the warning area.

More than 30 mm of rain is expected quite widely, but there is a chance some isolated locations could well see more than 70 mm of rain. Wind gusts are also expected to be strong across the warning area, with northerly winds gusting to 45 mph inland and around 55 mph along coasts. This combination of factors could bring the risk of disruption to outdoor activities and heavy holiday traffic.
Highways England has launched a website especially for drivers heading to the South West of England to help plan their journey.

Date Created
July 2015

Has 2015 really been that windy?

Description

We've recently had several questions from the public asking whether this year has been particularly windy compared to others and if there's any explanation for this. There's lots of ways at looking at these questions, but the quick answer from our National Climate Information Centre is that – yes, it has been windy this year and a lack of high pressure seems to be to blame. Here Mike Kendon, climate information scientist at the Met Office, takes a detailed look at the questions.

How many calm days?

One way of looking at this is to consider how many days there have been which have *not* been windy – i.e. calm days – and how this compares with the historical record. The bar chart below counts the number of days each year, for the UK overall, where at least 20 weather stations have recorded a maximum gust speed of 10 Knots (11 mph) or less. This is equivalent to, at most, a gentle breeze, while 20 stations would indicate such conditions fairly widespread for at least 24 hours.

2015 thus far has seen only 8 such days; this being the fewest number of calm days across the UK for at least 20 years – but bearing in mind this covers less than 7 of 12 months of the year so far. However, more notably none of these days have fallen in May, June or July so far.

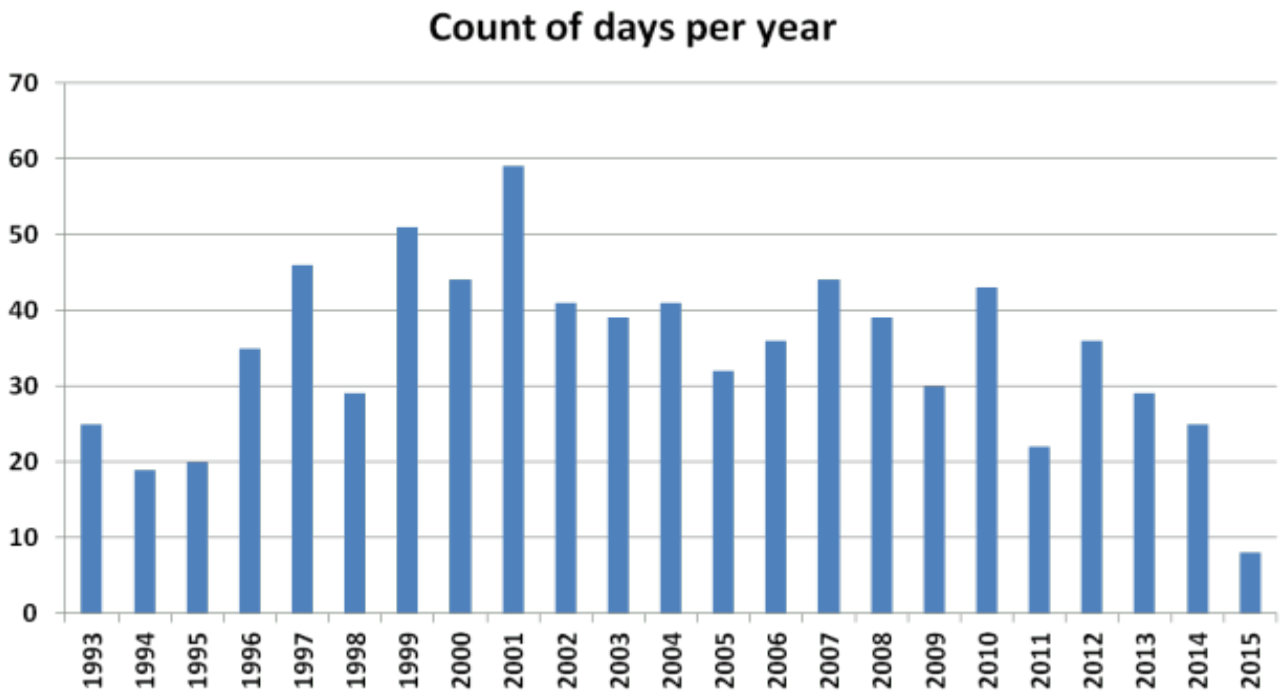
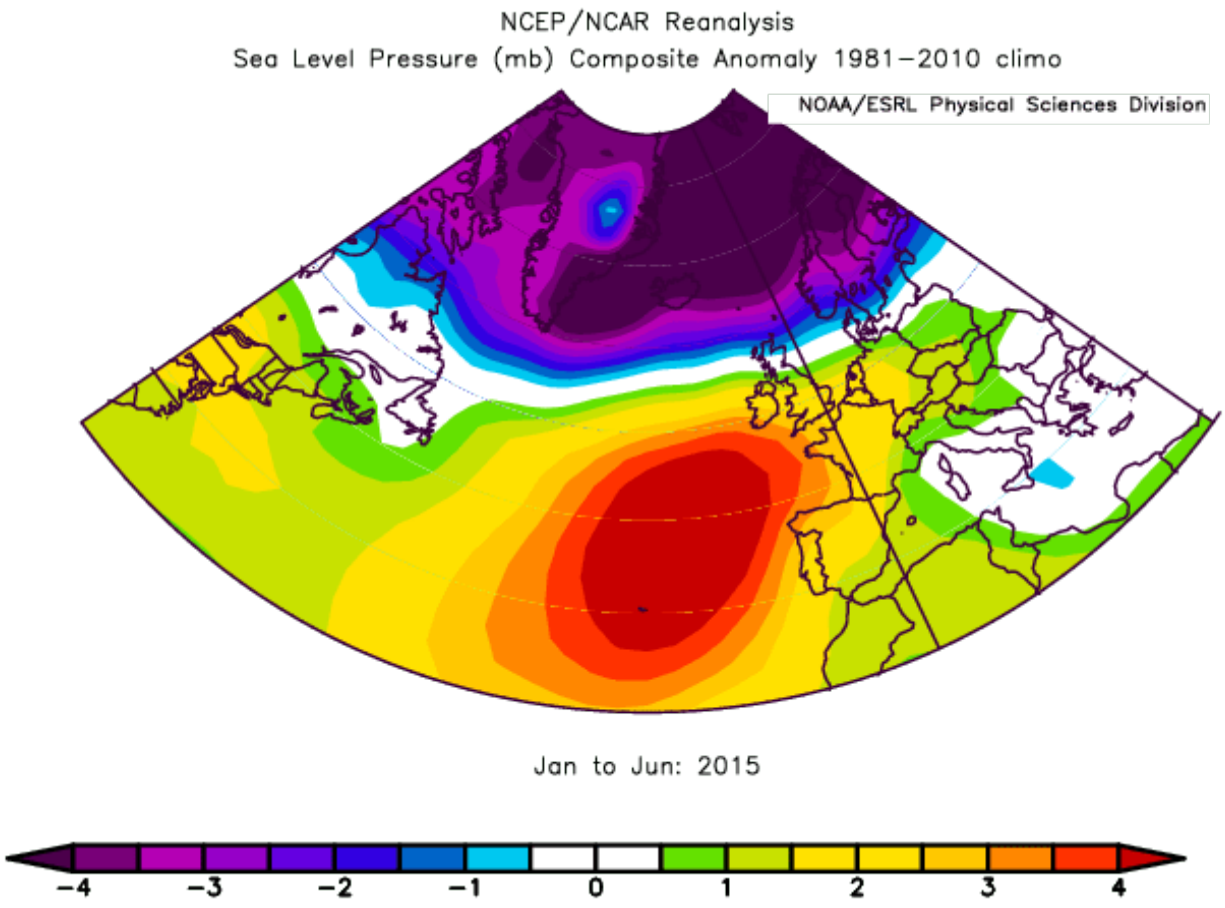


Chart showing the number of days per year where at least 20 UK weather stations have recorded a maximum gust speed <= 10 Kt (11 mph). 2015 data up to 22 July.

Pressure patterns

Calm days are typically associated with areas of high pressure, which normally bring dry, settled conditions during summer and cold, frosty conditions in winter – but common to both seasons often light winds. Areas of high pressure tend to block the prevailing westerly airflow across the UK. However, the variability of our climate means that some years see more days of high pressure, others see fewer such days.

The first map below shows the mean sea level pressure relative to average across the North Atlantic for the period January to June 2015. Over this 6-month period the pressure has been lower than normal to the north of Scotland but higher than normal to the south-west, resulting in a predominant westerly airflow over the UK, meaning that our weather has often been windy. Although during 2015 there have been some periods of high pressure, for example during March and early April, they have been relatively infrequent, particularly from May onwards. The pressure difference shown on the map between Iceland and the Azores is known as the North Atlantic Oscillation (NAO) index.



Pressure anomaly (difference from 1981-2010 average) in mb for the period January to June 2015 and January to June 2011, based on NCEP / NCAR Reanalysis data. Image provided by the NOAA/ESRL Physical Sciences Division.

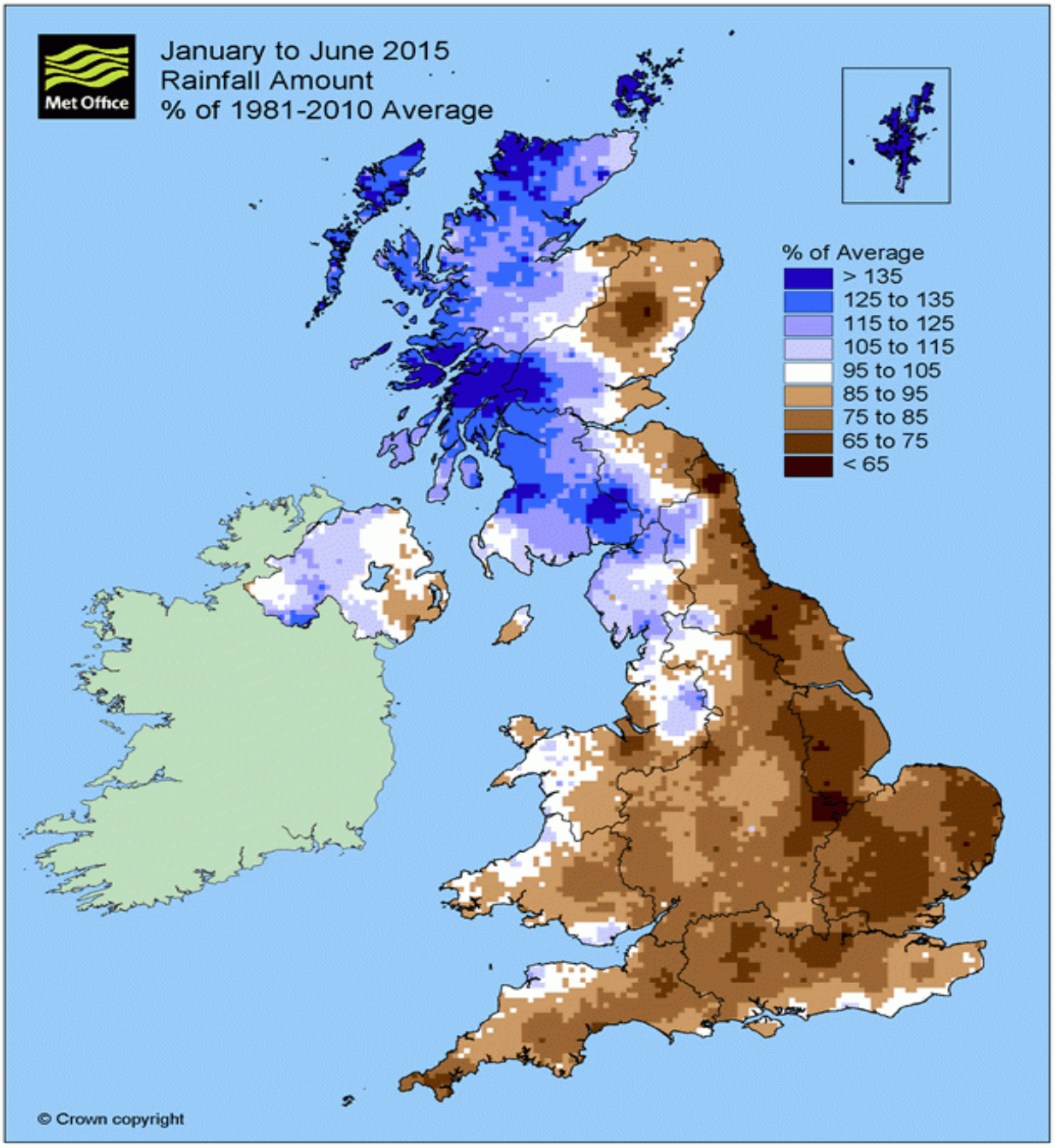
Rainfall patterns

A westerly airflow across the UK is generally associated with low-pressure systems from the Atlantic

bringing windy conditions and rain-bearing fronts. Since this is the UK's prevailing wind direction, the north-west is, on average, much wetter than the south-east, being most exposed to this direction. In addition, rainfall here is further increased due to the effect of hills and mountains.

During 2015, the persistent westerly airflow has resulted in this north-west / south-east contrast in rainfall patterns being exaggerated. For example, Achnagart, a weather station in the West Highlands of Scotland recorded 2082mm of rain in the period from 1st January to 22 July 2015, compared to 237mm for the same period at St James's Park, Central London – 9 times as much.

The map below shows rainfall totals compared to average from January to June 2015. So, this rainfall pattern is consistent with this westerly weather type, absence of prolonged spells of high pressure, and relatively windy nature of 2015 so far.



Rainfall January to June 2015 as % of 1981-2010 average for that period.

Date Created
July 2015

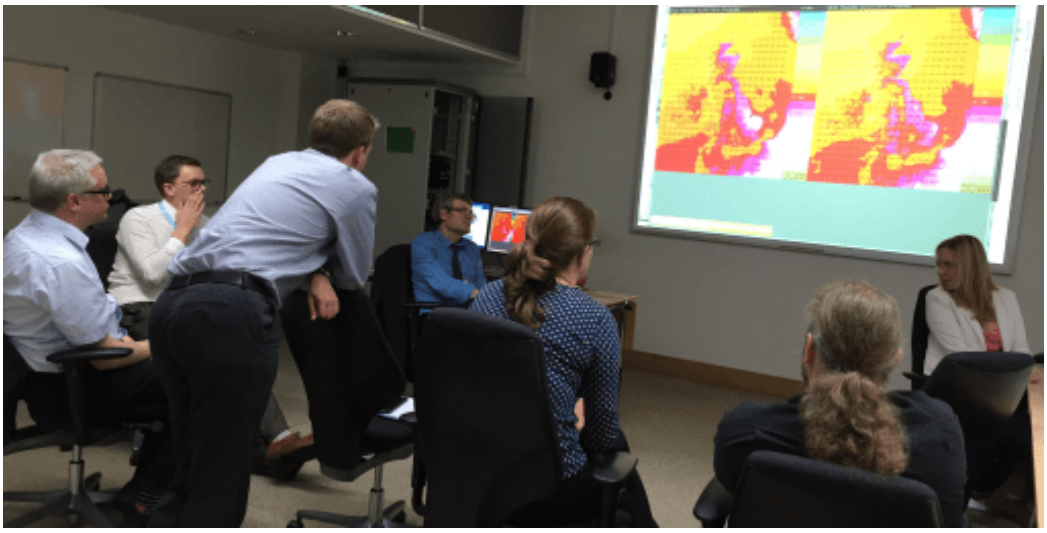
Met Office Forecasting Experiment

Description

Forecasting the weather accurately relies on a combination of cutting edge forecasting models developed by our research scientists and the skill of interpreting these models by expert meteorologists.

We've recently completed a "Forecasting Experiment" which brought together our research and operational expertise for two weeks.

The aim of this was to intensively evaluate and develop our current and experimental models, forecasting techniques, new scientific products and the interaction between them. The overall aim was to evaluate our forecasting capability so we can identify ways to continue improving the way we do things.



Experts from a range of backgrounds analyse model output in the 'Forecast Experiment'

We have a number of computer models which can represent weather processes which occur on ever smaller scales.

These models cover different areas of the globe: from the entire world, down to a model which is confined to the UK area and even an experimental model which looks at the weather over an area the size of a large city.

All these models are incredibly complex and have strengths and weaknesses which can be difficult to determine.

By bringing together specialists with considerably different skills and experience in the Forecasting Experiment, it is easier to identify characteristics of the models. This can then inform better interpretation of all the information available to forecasters and can also help with planning

improvements in future generations of the models.

The Forecasting Experiment this year was focused on summer weather over the UK. The experiment ran over the end of June and beginning of July.

The first week was characterised by a succession of weather fronts moving eastwards from the North Atlantic over the UK. The second week was dominated by very warm air from Spain moving north across the UK and bringing the hottest July day on record (36.7 °C at Heathrow) with severe thunderstorms to much of the UK, especially the North of England and Scotland.

This mixture of weather types allowed researchers to test models and techniques under a whole range of summer conditions, including high impact weather.

Adrian Semple,who led the experiment, said: “Not only did this experiment promote an exchange of skills, knowledge and experience between the participants, but it also provided a unique environment in which we could critically assess the way in which we produce our forecasts. The experiment will therefore have immediate effects as skills and knowledge are shared and spread throughout the Met Office, but the results can also be used to influence our longer term scientific research and improve future forecasting models.”

Date Created
July 2015

Are we set for record July rainfall?

Description

While July has seen a good deal of dry and bright weather, we've also seen a few periods of heavy rainfall.

Whether through intense thundery downpours or prolonged periods of rain such as seen in southern parts of the UK on Friday last week, these events have dramatically pushed up the rainfall totals for the month.

This has led to speculation about whether this July could be on course to be the wettest on record. However, a quick look at the statistics shows that while it has certainly been wet, we're unlikely to break any national records this month.

Provisional rainfall statistics for July 2015 so far suggest that with 5 days of the month remaining much of the country has already received close to or above average rainfall for the month – but we're some way off breaking the records for each country.

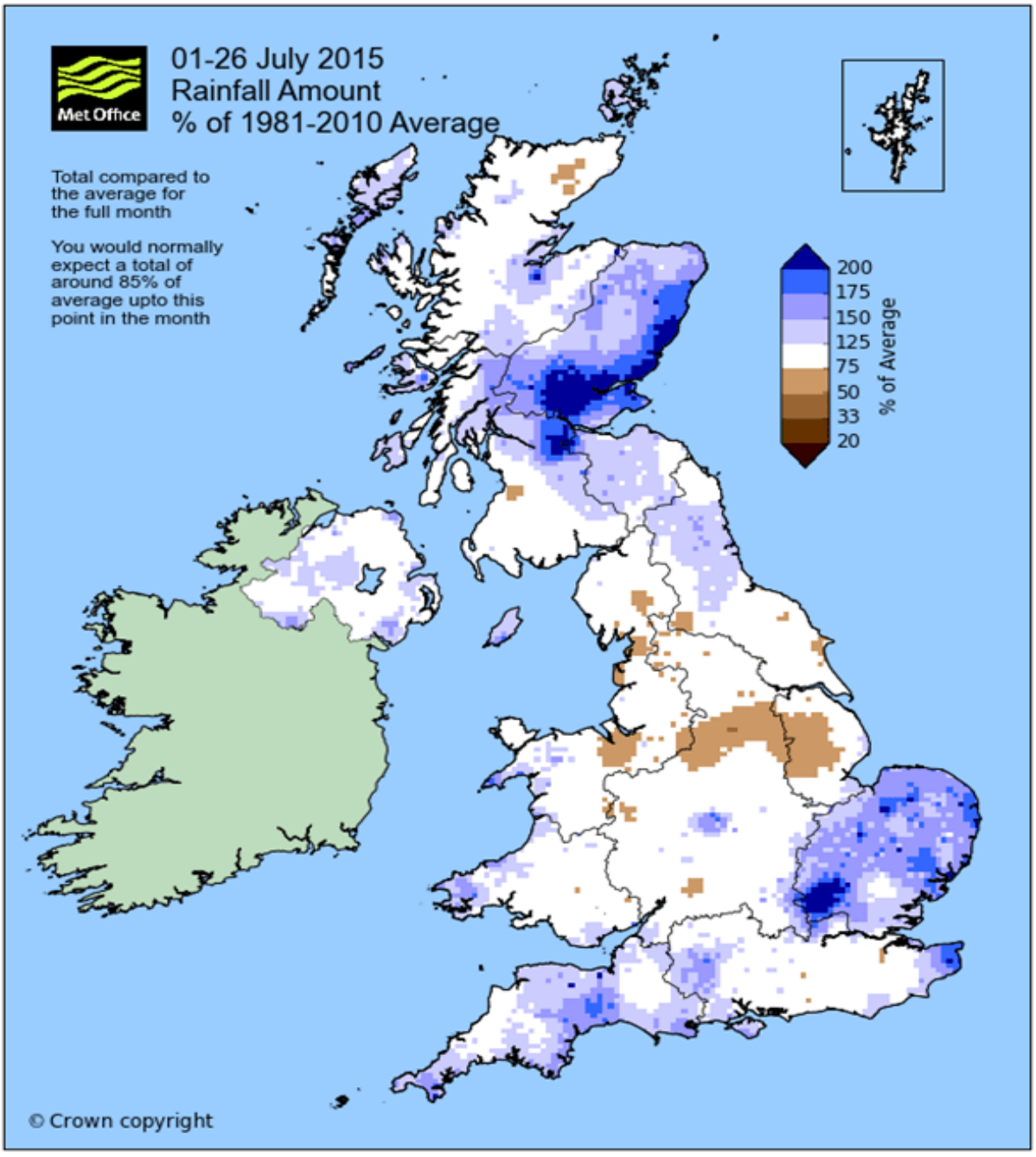
Table showing rainfall figures so far this month compared to average and the records:

	Rainfall 1-26 Jul 2015	Current record July	1981 – 2010 average
UK	93 mm	146 mm (2009)	78 mm
England	70 mm	129 mm (2009)	63 mm
Scotland	128 mm	186 mm (1940)	100 mm
Wales	102 mm	241 mm (1939)	93 mm
Northern Ireland	95 mm	186 mm (1936)	81 mm

The wettest regions compared to average have so far this month been eastern Scotland, East Anglia and the south west of England. If records are going to be broken they will most likely be localised rather than national records.

Even those regional records are far from a sure thing. The weather is generally improving for most parts of the country and high pressure, bringing more settled conditions, is expected to build towards the back end of the week.

This means the last few days of this month are unlikely to add big rainfall numbers to the totals we have so far.



Map showing 1-26 July 2015 rainfall compared to the 1981-2010 average. Most places have received their full-month average (shown in white), while the darker blue areas have seen significantly more than average already.

Date Created
July 2015

Summer weather to return as we head into weekend

Description

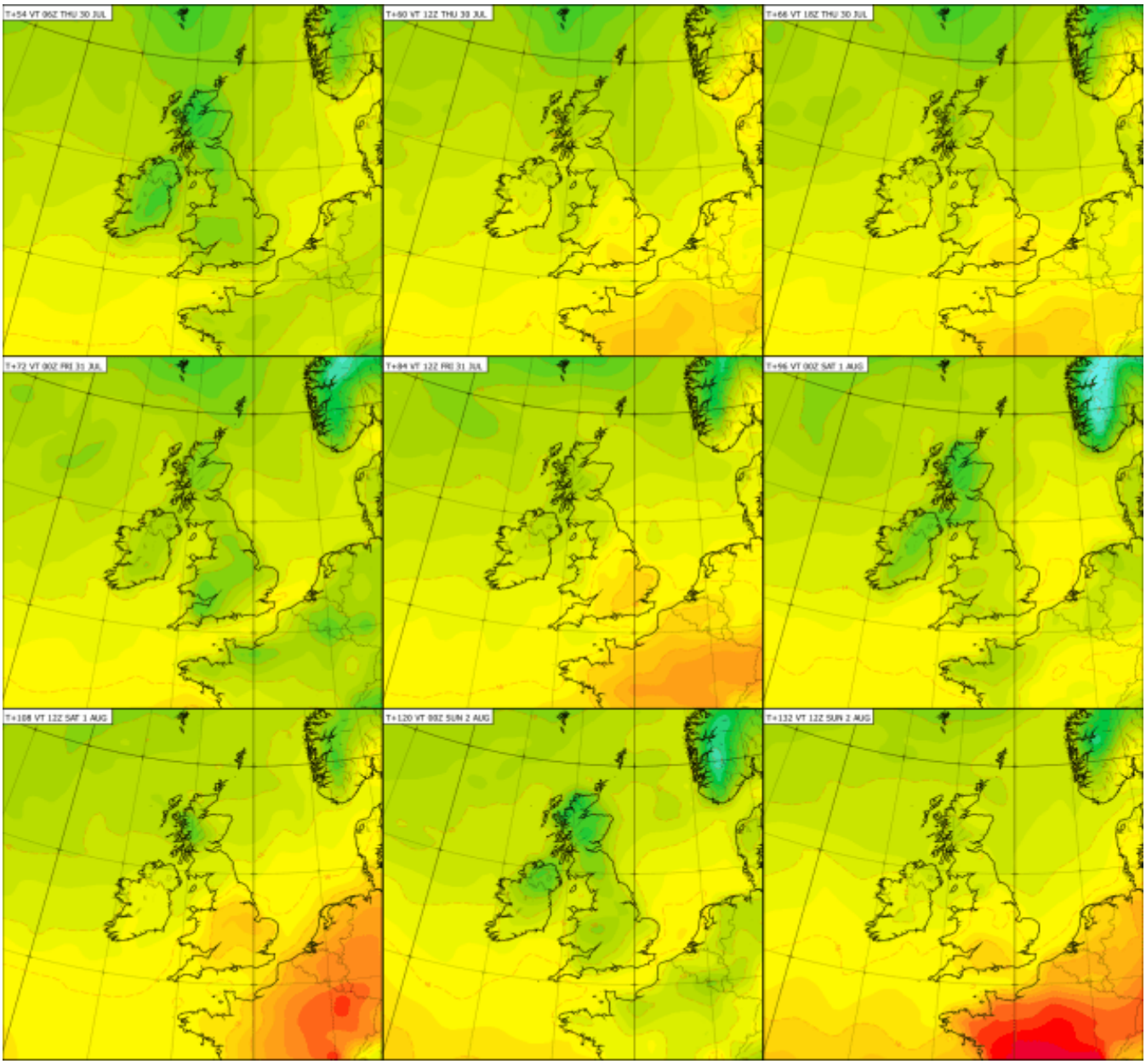
More summer-like weather will return to the UK with conditions and temperatures due to improve as we head into the weekend.

This will come as welcome news to many after a spell of disappointing weather over the past few days which has seen prolonged rainfall and some unseasonably strong winds.

Through to Thursday the UK will be seeing a flow of cool air from the north which is helping to keep day and night temperatures slightly below normal. Overnight temperatures in some rural areas could fall to a few degrees above freezing – with a few isolated spots even seeing frost early on Thursday.

This is all set to change, however, as the northerly flow will be cut off to allow westerly winds, and milder air, to push in later on Thursday.

This will enable temperatures to recover to more normal levels for the time of year across many parts of the country, although some cool nights remain likely.



Colour chart showing temperature change over the next few days, with cooler air (green) making way for warmer conditions (yellow/orange).

At the same time, high pressure is also set to establish across most of England and Wales to bring lighter winds and more in the way of sunshine for Friday

Scotland and Northern Ireland will continue to see some showers, and these may affect other northern areas into Saturday, though conditions will be markedly improved on recent days for many.

Over the weekend, many parts of England and Wales will be mainly dry with sunny spells. In light winds it will feel much warmer than of late, with temperatures back into the twenties across much of central and southern England.

It may also warm up further across southern and eastern areas on Sunday and into Monday.

Malcolm Roughead, Chief Executive of VisitScotland said: “It’s great to hear the weather is improving, however, come rain or shine, Scotland is a beautiful place to explore! Our surveys continually show that the weather is of little consequence to visitors. Whether it’s stormy clouds over the mountains of Glencoe or blue skies over coral beaches in Skye, visitors are in awe of the breathtaking scenery and visit and re-visit in their droves for the landscapes, cities, culture and friendly people.”

“With lots of exciting events and activities planned across the country including, of course, the world-famous Edinburgh Festivals next month, we know visitors will have an experience of a lifetime in Scotland this summer regardless of the weather.”

James Berresford, Chief Executive for VisitEngland, said: “The forecast of good weather is great, especially with the summer season upon us. The release of our latest figures today reveal a strong performance for domestic tourism in the first quarter of this year so we hope this will continue over the summer months. We know holidays in England generate high levels of satisfaction for visitors, and with world class indoor and outdoor attractions, fantastic events and festivals across the country there is still time to plan a last minute short break or day trip in England whatever the weather.”

While we will have a spell of good weather and more summer-like temperatures for many into the weekend, it looks as if more unsettled conditions will move in from the west later on Sunday. These conditions will spread slowly east on Monday, with all areas seeing more unsettled conditions by Tuesday.

Temperatures are likely to be closer to normal by then.

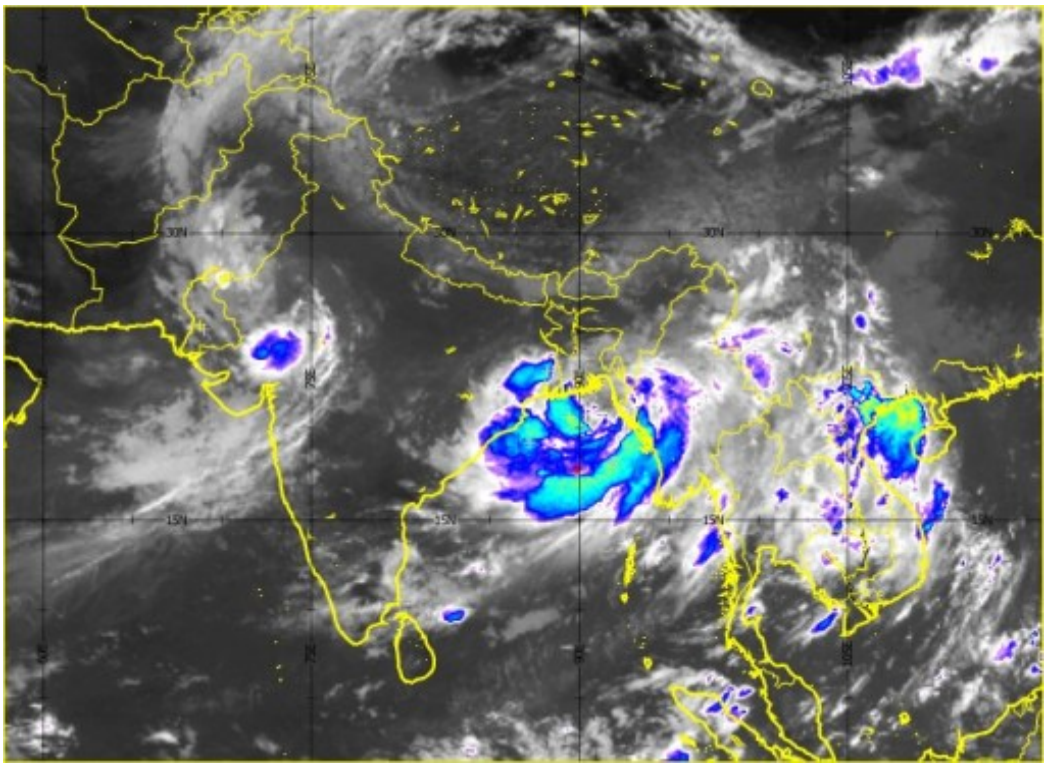
Stay up to date with our forecasts to see how the wather is set to improve in your area.

Date Created
July 2015

One metre of rain to fall in the Bay of Bengal

Description

Parts of the Ganges Delta have already seen over 240mm of rain in just 24 hours and coastal areas to the north of the Bay of Bengal are expected to receive over 1000mm over the coming 48 to 72 hours. The area will also see some strong winds, with gust of up to 60mph along the coast. This severe weather is likely to have significant impacts with a risk of flooding, landslides and damage to infrastructure.



Satellite image of monsoons over Pakistan, Bay of Bengal, and South China

After a break in monsoon rainfall across parts of India through much of July, the region is now experiencing a more active phase. Over the Bay of Bengal, a deep monsoon depression has developed, bringing a period of prolonged heavy rain and strong winds to coastal districts of northeast India, Bangladesh and northwest Myanmar. A monsoon depression is an area of low pressure which brings intense rainfall, and with other ingredients in place, can develop into a tropical cyclone.

The monsoon depression is expected to remain slow moving, tracking into Bangladesh over the next few days before gradually moving west across northeast India over the weekend.

Unusually, this is one of three monsoon depressions affecting South Asia. As well as the monsoon over the Bay of Bengal there is a monsoon bringing heavy rainfall to northwest India and Pakistan with

as much as 430mm of rainfall falling in 24 hours. A third slow-moving depression is also affecting northeast Vietnam and southeastern China. 543mm 718mm has fallen in 42 66 hours in Mong Cai City on the border between Vietnam and China, an area that was affected by Tropical Storm Kujira last month.

Elsewhere in the world, the hot dry conditions which have affected southern Europe through much of July have led to some wildfires in Catalonia, Spain, and the Provence region of France. There is expected to be some respite from the high temperatures across Spain and France though in the coming days as a cold front pushes in from the north bringing a risk of heavy showers and thunderstorms to northeast Spain and Southern France by the weekend.

Date Created
July 2015

Wet and dull July

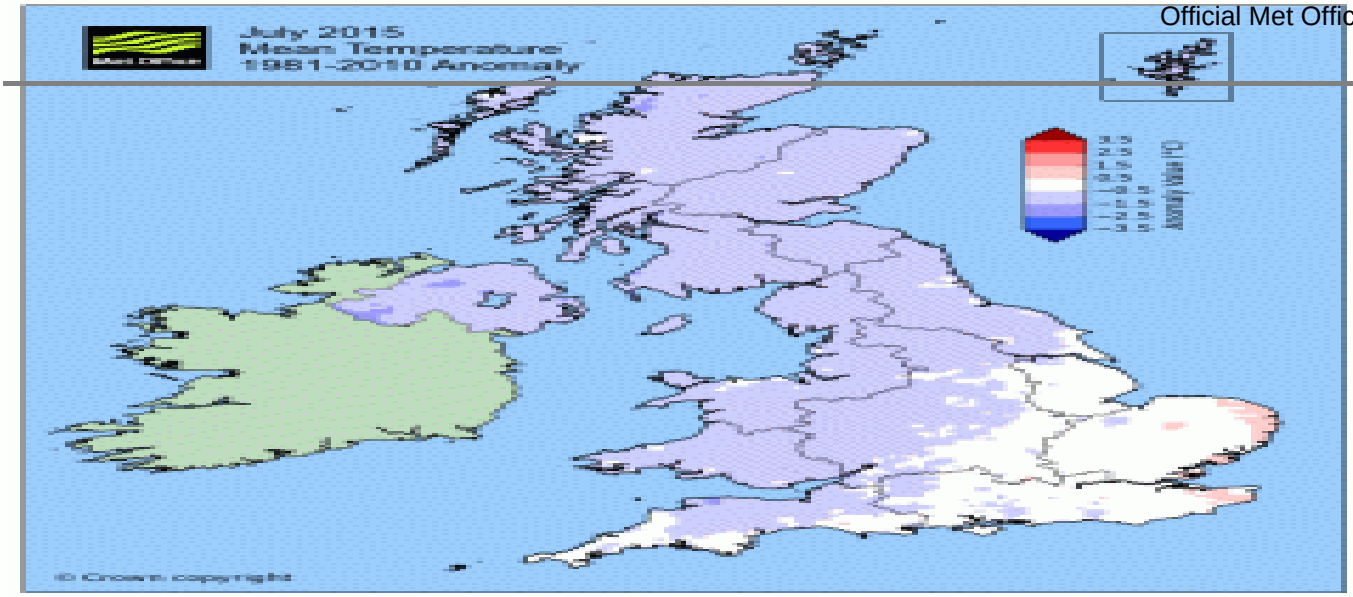
Description

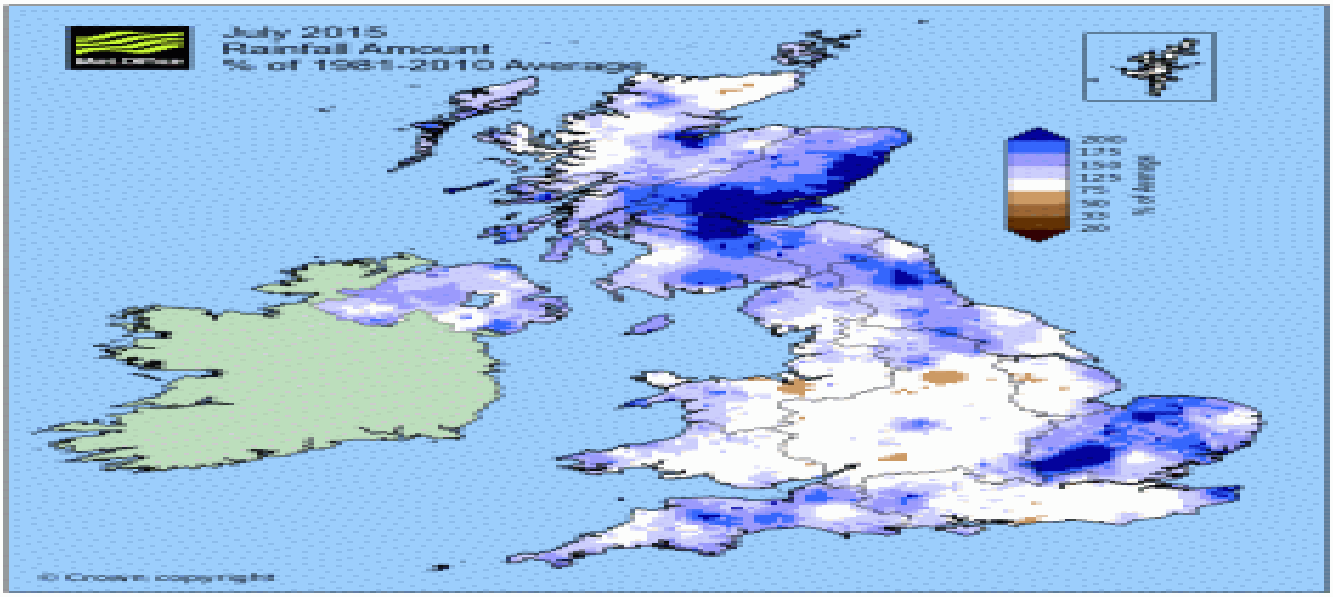
UPDATE: The figures below have now been updated to include data from the 1-31 July 2015.

July 2015 was cool, dull and wet across the UK according to Met Office statistics for 1-31 July.

The month began with a record-breaking heatwave, with hot, humid air moving in from the continent. 36.7 °C was recorded at Heathrow 1 July, the highest recorded temperature in the UK since August 2003.

However the rest of the month has been characterized by cooler and often more unsettled conditions, particularly in the north, as a result of a westerly Atlantic air flow. Rainfall has been above average in most areas, particularly across parts of East Anglia, central and eastern Scotland.





	minimum temperature		mean temperature		sunshine duration		precipitation	
Jul 1 – 31 2015	**Act (°C)**	**Diff from avg (°C)**	**Act (°C)**	**Diff from avg (°C)**	**Act (hrs)**	**% of avg**	**Act (mm)**	**% of avg**
UK	10.3	-0.6	14.4	-0.7	164.8	96	109.5	140
England	11.2	-0.4	15.8	-0.5	191.9	99	82.3	131
Wales	10.8	-0.3	14.4	-0.8	175.1	98	112.4	121
Scotland	8.7	-0.9	12.2	-1.0	125.3	89	152.4	153
N Ireland	9.6	-1.1	13.3	-1.3	117.4	84	116.8	144

The south-east has seen some drier and more settled weather with temperatures near average,

although there has also been some changeable weather here with over 20mm of rain falling on the 24 July and some cooler temperatures and strong winds on 26 and 27 July.

Elsewhere temperatures have been below average, particularly in the west and north, and it has been a rather dull month with sunshine totals being below average across much of the country.

Data from the Met Office's UK digitised records dating back to 1910. You can explore our climate data on our website.

Date Created
July 2015